

DaimlerChrysler AG  
Stuttgart

Patent Claims

*Sub A1*

1. Joining connection between a circumferentially closed hollow profile (1) and an add-on part (2) which is provided with a passage opening (5), consists of a material of lower yield strength than the material of the hollow profile (1) and, on the inside (7) of the passage opening (5), has a recess (10) which is spaced away from the end sides (8, 9) of the add-on part (2), the add-on part (2) being slid with its passage opening (5) onto the hollow profile (1) and being jammed to the latter in this sliding-fit position by a local expansion of the hollow profile (1), said expansion being formed by means of internal high-pressure deformation at the location of the recess (10).
2. Joining connection according to Claim 1, characterized in that the recess (10) is an annular freely turned recess.
3. Joining connection according to Claim 1, characterized in that the hollow profile (1) consists of a ductile steel material, preferably of St 37 or St 52, and the add-on part (2) consists of a casting material, of a die casting or injection moulding, preferably of ZnAl4Cu1, or of a lower-strength steel or of a light metal material.
4. Joining connection according to Claim 1, characterized in that the recess (10) is of curved design with a shallow rise from its base (15) as far as its edges (16).
5. Joining connection according to Claim 1, characterized

in that the expanded point of the hollow profile (1) bears in an exact manner against the walls (14) of the recess (10).

6. Method for producing a joining connection between a circumferentially closed hollow profile (1) and an add-on part (2) which is provided with a passage opening (5) and consists of a material of lower yield strength than the material of the hollow profile (1), a recess (10) which is spaced away from the end sides (8, 9) of the add-on part (2) being formed on the inside (7) of the passage opening (5), after which the add-on part (2) is slid with its passage opening (5) onto the hollow profile (1), and subsequently the hollow profile (1), in the sliding-fit position reached, is expanded locally into the recess (10), by a fluidic internal high pressure by means of an expansion lance inserted into the hollow profile (1), in such a manner that the hollow profile (1) is jammed immovably to the add-on part (2).

7. Method according to Claim 6, characterized in that the recess (10) is of curved design with a shallow rise from its base (15) as far as its edges (16), and in that the hollow profile (1) is expanded until it bears completely against the recess walls (14).

8. Method according to Claim 6, characterized in that the add-on part (2) is cast as a cast part having a discarded core, the recess (10) being cast at the same time.

9. Method according to Claim 6, characterized in that the add-on part (2) is injection moulded or die cast and the recess (10) is subsequently freely turned.

30 10. Method according to Claim 6, characterized in that the add-on part (2) is formed, in particular forged, from

28827/WO/1

- 12 -

a low-strength steel, and in that the recess (10) is then engraved, turned or milled out.

11. Steering column of motor vehicles having a casing tube which surrounds a steering spindle and forms a hollow profile, and a holder, constituting an add-on part, for example for a steering column switch, the holder being joined onto the casing tube, characterized in that the holder (2), which consists of a material of lower yield strength than the material of the casing tube (1), has a circumferentially closed passage opening (5) and is slid with the latter onto the casing tube (1), the passage opening (5) having, on the inside (7), at least one recess (10) which is spaced away from the end sides (8, 9) of the holder (2), which end sides lie transversely with respect to the longitudinal direction of the casing tube (1), and in that the casing tube (1) has a locking element which, in the sliding-fit position of the holder (2), is shaped radially from the wall of the said holder locally at the location of the recess (10) by a fluidic internal high pressure and is jammed in the recess (10) as a consequence of its shape, forming a nonreleasable joining connection between the holder (2) and casing tube (1).

12. Steering column according to Claim 11, characterized in that the locking element bears over the entire surface against the recess walls (14).

13. Steering column according to Claim 11, characterized in that the recess (10) is formed by an annular groove and the locking element is formed by an annular bead (17).

14. Steering column according to Claim 11, characterized in that the casing tube (1) consists of a ductile steel

- 13 -

material, preferably of St 37 or St 52, and the holder (2) consists of a casting material or of an injection moulding or die casting, preferably of ZnAl4Cu1, or of a low-strength steel or of a light metal material.

5 15. Steering column according to Claim 11, characterized in that the recess (10) is of curved design with a shallow rise from its base (15) as far as its edges (16).